

(No Model.)

G. SELVE.

METHOD OF MANUFACTURING METAL ALLOYS.

No. 296,884.

Patented Apr. 15, 1884.

Fig: 1.

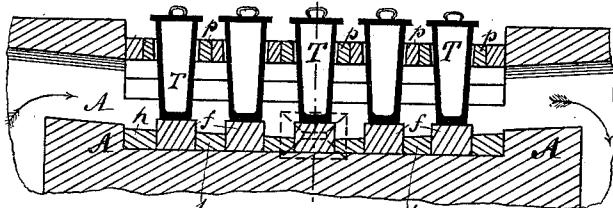


Fig: 2.

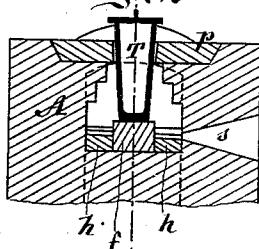


Fig: 3.

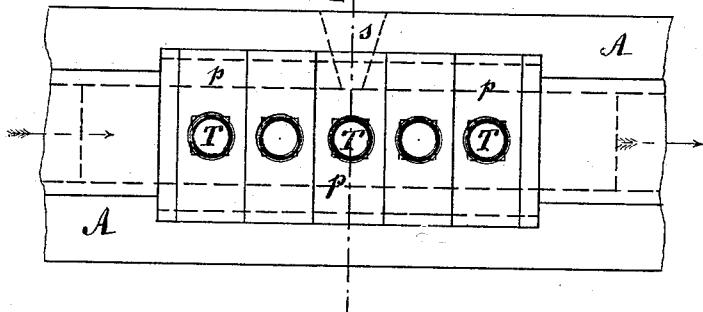


Fig: 5.

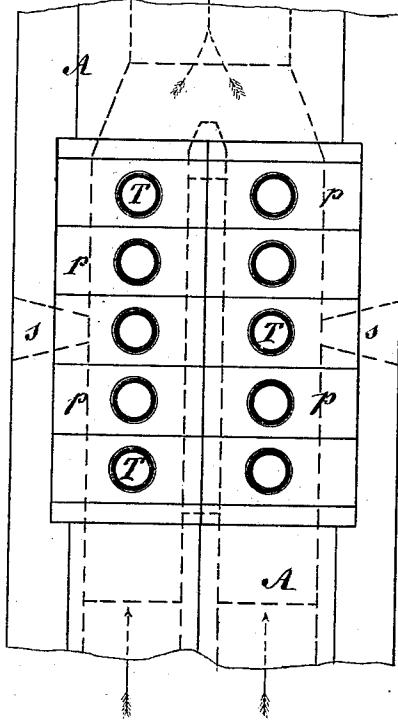
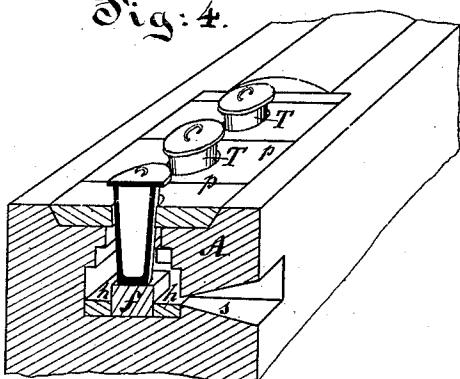


Fig: 4.



Witnesses

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METHOD OF MANUFACTURING METAL ALLOYS.

SPECIFICATION forming part of Letters Patent No. 296,884, dated April 15, 1884.

Application filed June 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV SELVE, of Altena, Westphalia, Prussia, Germany, have invented certain new and useful Improvements 5 in the Method of Manufacturing Metal Alloys, and in Apparatus for the Same, of which the following is a specification.

The present invention has more particularly for its object, first, to effect the smelting of the 10 superior metals, in particular copper and zinc, to form alloys—such as brass and tom-
bac—by preference in regenerative gas-furnaces; but other furnaces may be used in such a manner that, notwithstanding the high tem-
peratures required for smelting the metals and 15 at which the zinc volatilizes, there shall be only slight losses of the zinc; second, to avoid the various disadvantages attendant on the working of furnaces where the smelting is ef-
fected in crucibles with direct application of 20 fire heat. The ordinary practice involves, in addition to the loss of zinc, the continued ex-
posure of the workmen to a high degree of heat and to the injurious fumes of zinc. According 25 to my invention the smelting is effected in crucibles in which, in consequence of the mode in which they are constructed and the manner in which they are set in the furnace, there exists at bottom a much higher tempera-
ture than at top. In order to obtain this dif-
ference of temperature, the crucibles are made 30 somewhat longer and of smaller diameter, and only the lower part thereof is situated inside the furnace, the upper part being made to pro-
ject through the arch or roof of the furnace. For smelting, for example, copper and zinc in 35 such crucibles to form brass, the copper is first placed in the crucible and is melted at a temperature of from 1,050° to 1,200° centi-
grade, and the zinc is then quickly added in 40 the requisite proportions—such as from one-
third to one-half the quantity of copper—and brass waste is added to render the whole pasty, while at the same time cooler layers of metal 45 are by this means formed in the upper part of the crucible. Thus the upper layers of metal are of a much lower temperature than below, and they are maintained at this low tempera-
ture by the successive further addition of cold 50 brass waste, thereby causing the condensation of the greater part of the zinc vapors as they

rise up into the cooled layers from the lower highly-heated layers of metal. By this means only small losses of zinc can take place, and these mainly at the first introduction of the 55 zinc into the molten copper. On the average, only about from one-third to one-fourth the loss of zinc which takes place in the ordinary smelting process of zinc is experienced by this method. After the whole of the metal is melt-
ed the crucible is removed and the contents 60 stirred, so as to obtain a homogeneous alloy. Should, during the stirring or at any period, further zinc vapors be formed, the upper liq-
uid layers of metal, which are still at a lower 65 temperature than the lower ones, (about 900° centigrade at top and 1,200° below,) are cooled with water, thus causing the condensation of such vapors.

The accompanying drawings form a part of 70 this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a vertical longitudinal section, Fig. 2 is a vertical transverse section, Fig. 3 75 is a plan view, and Fig. 4 a perspective view, of a portion of a furnace equipped for work-
ing. Fig. 5 is a plan view of a modification, in which there are two rows or sets of cruci-
bles and corresponding holes in the furnace to 80 receive them.

Referring to Figs. 1, 2, 3, and 4, A is the furnace arranged according to this invention, with five crucibles, T. The long crucibles, somewhat smaller in diameter than usual, are 85 introduced through openings in the roof of the furnace onto refractory blocks f, so as to pro-
ject with their upper ends out of the furnace. The roof of the furnace is formed of refractory 90 slabs p, having openings corresponding to the diameters of the crucibles. Between the sides of the crucibles and the opening a small space is left, (about 0.2 inch,) in order to prevent the two from melting together. The bed h of the furnace inclines slightly from all sides to 95 the middle, so that should a crucible break during the smelting, the metal can at once be removed through the tapping-hole s.

The furnace may be constructed to take a greater or less number than five crucibles, ac- 100 cording to requirements, and these may be ar-
ranged in two or more rows.

Fig. 5 shows a furnace arranged to receive ten crucibles.

The advantages of this method of smelting and mode of setting the crucibles are, mainly, 5 as follows: First, the loss of zinc is reduced to a minimum, as it is almost entirely taken up by the alloy; second, a high degree of efficiency and regularity of working is obtained; third, a considerable saving of fuel is effected, 10 as the furnace is closed during the smelting process, with the exception of the small interstices between the crucibles and the openings, the latter being closed quickly and easily by covers when the crucibles are removed; fourth, 15 the labor is easier and less injurious, as the workman is hardly at all subjected to the zinc fumes and the heat is much less felt; fifth, the castings remain clear, because the alloy cannot be deteriorated during the smelting by 20 particles of fuel, such as frequently fall into the crucibles with ordinary furnaces; sixth, there is a less destruction of crucibles, as these sustain double the number of charges as compared with the ordinary process of smelting. 25 I claim as my invention—

1. The method of smelting alloys, more particularly those of zinc, in closed crucibles that are situated with their lower parts in the fur-

nace, while their upper parts project out of the same, consisting in supplying the crucible 30 with copper and melting it, then quickly adding zinc in proper proportions and brass waste, then closing the crucible and applying heat to the lower part thereof, while the upper part is externally exposed to the air, whereby the 35 zinc vapors generated in the lower hotter layer of metal become condensed in rising up into the upper cooler layers, as herein specified.

2. In smelting zinc alloys, the method herein described, consisting in supplying the crucible 40 with copper and melting it, then adding zinc in proper proportions and brass waste, then closing the crucible and applying heat to the lower portion of the same, and thus effecting the condensation of the zinc vapors generated 45 in the lower part of the crucible by means of the cooler upper layers of metal therein, substantially as herein specified.

In testimony whereof I have hereunto set my hand at Berlin, this 29th day of May, 1883, in 50 the presence of two subscribing witnesses.

GUST. SELVE.

Witnesses:

C. GRONERT,
B. ROI.